

WHAT IS CLAIMED IS:

1. A method of manufacturing a tire in which a green tire is formed by providing a tire structural member, including bead cores, around a toroidal hard core, loaded in a mold, and vulcanized to obtain a pneumatic tire, the method comprising the steps of:

    forming a carcass along an outer circumference of the hard core;  
and

    turning up, around the bead cores, inner edge portions in a radial direction of the carcass formed on an outer surface of the hard core, by expanding outwardly in a radial direction expanding/contracting means inserted at an inner side in a radial direction of the bead cores and/or the hard core.

2. The method of manufacturing a tire according to claim 1, wherein the step of forming the carcass comprises setting an unvulcanized rubber-coated cord on the hard core from one side surface portion to the other side surface portion of the hard core, turning the cord back at the other side surface, setting the cord on the hard core from the other side surface portion toward the one side surface portion and turning the cord back again, and setting the cord sequentially along a core circumferential direction.

3. An apparatus for manufacturing a green tire applicable to a method of manufacturing a tire in which a green tire formed by providing a tire structural member, including bead cores, around a toroidal hard core, is

loaded in a mold and vulcanized to obtain a pneumatic tire, the apparatus comprising:

expanding/contracting means which can be inserted at an inner side in a radial direction of the bead cores and/or the hard core, and which expand and/or contract in a radial direction; and

moving means for moving the expanding/contracting means in an internal direction or an external direction with respect to the hard core.

4. The apparatus for manufacturing a green tire according to claim 3, wherein the expanding/contracting means are toroidal bladders.

5. The apparatus for manufacturing a green tire according to claim 4, wherein engaging members, which are engageable with inner edge portions in a radial direction of the carcass, are provided at outer sides in an axial direction of the bladders.

6. The apparatus for manufacturing a green tire according to claim 4, wherein carcass-engaging portions, which, in a contracted state of the bladders, are engageable with inner edge portions in a radial direction of the carcass, are formed integrally with outer surfaces in an axial direction of the bladders.

7. The apparatus for manufacturing a green tire according to any one of claims 4 to 6, further comprising pressing means for pressing the bladders, when they are inflated, toward the hard core, and press-contacting turn-up portion of the carcass with a main body.

8. The apparatus for manufacturing a green tire according to claim 3, wherein the expanding/contracting means comprises arm portions which can be inserted at inner sides of the hard core and rollers which are provided at one end of the arm portions, and the driving means for moving the arm portions in an axial direction and in a radial direction of the hard core.